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EXAMINER

KLEBE, GERALD B

ART UNIT PAPER NUMBER

3618

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/631,017

Applicant(s)

WEIDENHEIMER ET AL.

Examiner

Gerald B. Klebe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24, 26, 27, 30 and 32 is/are rejected.
- 7) ☐ Claim(s) 25, 28, 29 and 31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

M.B. Klebe
1 May 2005

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification - Objections

1. The specification is objected-to for the following informalities:
 - a. The specification throughout includes a number of instances where acronyms are used without accompanying definitions; where acronyms are employed in the specification, it is necessary to include their definition in the first instance of use. Some examples are the following: On page 1: find the acronym CHPS used without definition; similarly on page 2: the acronym, QE2; on page 3: HEV; on page 7 both ETC and ERB appear the first time without definition. Other instances exist.
 - b. Paragraph 1: in line 24 the phrase “all one or” appears to be superfluous.
- Applicant should review the specification and make the appropriate corrections.

Claims - Objections

2. The claims are objected to because of the following:
 - a. Informalities in the claims recitations. Some examples are:

Claims 7, 9, 16, and 18 recite the acronym “IGBT” without defining the term;

Similarly:

Claims 8, 10, 17, and 19 recite the acronym “MOSFET”;

Claims 20, 21, 28, and 29 recite the acronyms “DC” and “DC-DC”;

Claims 26 and 27 recite the acronyms “RC” and “LC”;

Claim 31 recites the acronym “AC-DC”;

Claim 32 recites the acronyms “ETC”, “EM” and “RF”.

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Wherever an acronym is recited in a claim or a series of related claims it should be defined at the place first recited and the acronym enclosed in parentheses.

Appropriate correction is required.

b. Non-sequitur listing of claims 20-32.

A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n) (iv).

Claim(s) Rejections - 35 USC § 112, 2nd Paragraph

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 34 of the claim, the phrase "such as" renders the claim indefinite since the claim does not clearly set forth the metes and bounds of the patent protection desired and therefore it is unclear whether the limitations following the phrase are part of the claimed invention. *Ex parte Steigewald*, 131 USPQ 74. Refer also MPEP § 2173.05(d).

Claim(s) Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Thompson et al. (US 3923116).

Thompson et al. discloses an electronically reconfigurable battery (Fig 5, item 16), comprising:

(re: claim 1)

A first plurality of battery modules (Fig 5, items 31, 32);

A plurality of switches (81, 82) selectively interconnecting the plurality of battery modules (refer col 8, lines 47-51), wherein a selectable number of the plurality of battery modules may be connected either in a series configuration or in a parallel configuration (refer col 2, lines 16-20), as a result of placing selected switches of the plurality of switches in open states or closed states; and an output switch (83) connecting a first output terminal of the battery to a first load (14); and,

(re: claim 2) wherein each of the plurality of battery modules is associated with at least three switches of the plurality of switches, one of which connects the battery module in series with an adjacent battery module when closed, and the other two of which connect the battery module in parallel with an adjacent battery module when closed, such that when the one switch is closed

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the other two switches are open, and when the one switch is open, the other two switches are closed.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 3923116).

As discussed above, Thompson et al. discloses all of the features of claim 1 from which claims 3-6 depend.

Thompson et al. lacks explicit disclosure of (**re: claim 3**) a second plurality of battery modules, each of the second plurality of battery modules being connected in parallel with each other, and wherein the first plurality of modules is selectively connectable to the second plurality of modules through at least two of the plurality of switches, and (**re: claim 4**) wherein the second plurality of battery modules are connected to a second load at a second output terminal of the reconfigurable battery, and (**re: claim 5**) wherein the second load is a motor.

However, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have modified the disclosure of Thompson et al. to include (**re: claim 3**) a second plurality of battery modules each connected in parallel with each other, wherein the first plurality of battery modules is selectively connectable to the second plurality of modules through at least two of the plurality of switches, and having (**re: claim 4**) a second

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output terminal for the reconfigurable battery, and to have connected a motor as a second load thereto, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding the features of claim 6, Thompson et al. lacks explicit disclosure wherein the first load comprises an electromagnetic armor system. However, this recitation is a mere recitation of intended use, and has been afforded no patentable weight since it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

9. Claims 1-6, 20-21, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 6703722).

Christensen discloses an electronically reconfigurable battery (Fig 1, items 11; refer col 13, lines 26-34) comprising:

(re: claim 1)

a. A first plurality of DC power source modules (Fig 16; taken as items 1-8). Note that in this application fuel cells and batteries are considered to be art equivalents, as discussed below);

A plurality of switches (311, 312, 313, etc.) selectively interconnecting the plurality of DC power source modules (refer col 15, lines 14-45), wherein a selectable number of the plurality of DC power source modules may be connected either in a series configuration (refer Figs 17 and 18) or in a parallel configuration (refer Figs 19 and 20), as a result of placing selected switches of the plurality of switches in open states or closed states (in the figures 18 and

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19 the shaded switches are closed, the unshaded switches are open; refer col 15, lines 46-67); and an output switch (considered inherent as part of item 186) connecting a first output terminal (301, 302) of the electronically reconfigurable battery to a first load (14; refer col 12, lines 6-8).

b. Christensen discloses the claimed invention except for disclosing fuel cells rather than battery cells. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used battery cells and fuel cells interchangeably in this application since the examiner takes Official Notice of the equivalence of battery cells and fuel cells for their use in the automotive electrical power supply arts, and the selection of any of these known equivalents to provide a source of direct current voltage would be within the level of ordinary skill in the art.

(**re: claim 2**) Christensen further discloses wherein each of the plurality of DC power source modules is associated with at least three of the plurality of switches (consider, for exposition, the one DC power source module (fuel cell 3) as shown in Figs 18 and 20 as representative of each of the modules; Fig 18 shows the switch configurations (310) when the modules are connected in series and Fig 20 shows the switch configurations (310) when the modules are connected in parallel; the at least three switches taken as the one switch 315 and the two other switches taken as the two switches 320 and 322), one of which (315) connects the batteries in series when closed (note that the switch 315 is closed in Fig 18), and the other two of which (320 and 322) connect the batteries in parallel when closed (note that the switches 320 and 322 are closed in Fig 20), such that when the one switch (315) is closed (Fig 18) the other two (320 and 322) are both open and when the one switch (315) is open (fig 20) the other two switches (320 and 322) are closed.

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(**re: claim 3**) Christensen's electronically reconfigurable battery is disclosed as further comprising a second plurality of DC power source modules (120) each module being connected in parallel with the other (as shown in Fig 20), the first plurality of modules being selectively connected to the second plurality of modules through at least two of the plurality of switches.

(**re: claims 4-6**) Christensen discloses the claimed invention except for explicit disclosure wherein (**re: claim 4**) the second plurality of battery modules are connected to a second load at a second output terminal of the reconfigurable battery, and (**re: claim 5**) wherein the second load is a motor, and is silent (**re: claim 6**) wherein the first load comprises an electromagnetic armor system. However, it would have been obvious to one having ordinary skill in the art at the time the instant invention was made to have modified the disclosure of Christensen to include a second output terminal of the reconfigurable battery connected to a second load since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.; (**re: claim 5**) Christensen lacks explicit disclosure wherein a second load comprises a motor however, it would have been obvious to one or ordinary skill in the art to have further used the reconfigurable battery of Christensen to support a motor as a load since Christensen states (refer col 6, lines 1-4) that "the load (14) could include any type of equipment which has a constant or variable electrical demand over time", an electrical motor being an equipment which meets these conditions. **Regarding the recitations of claim 6** wherein the first load comprises an electromagnetic armor system, these have been afforded little patentable weight since this recitation is a recitation of intended use, and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to

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be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

(**re: claim 21**) wherein DC current is limited by selection of electrochemical discharge characteristics of the selected battery technology, this is considered an inherent characteristic of electrochemical batteries; and,

(**re: claims 20 and 32**) Regarding the limitations of these claims: as discussed above, Christensen meets the limitations of claim 1 from which each of claims 20 and 32, respectively, depend. Regarding the additional recitations of claim 20 and of claim 32: "...wherein said battery can be reconfigured to match a hybrid vehicle with a variable DC mains bus voltage used for parade/standby level reliability and that can reconfigure to shorter life higher power combat mode..." (**claim 20**), and "... wherein the battery is adapted for use in high to extreme peak to average power output pulsed power applications and platforms for non vehicular applications such as Electric Cannons, ETC guns, pulsed lasers, EM Jammers, RF, microwave, x-ray sources and man pack systems..." (**claim 32**), each of these recitations is functional language. It has been held that the recitation that an element is "adapted for" performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. The functional recitation of intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the function or intended use, then it meets the claim. *In re Casey*, 370 F.2d 576, 152 USPQ 235, 238 (CCPA 1967).

It is the examiner's position that the prior art of Christensen is capable of performing the recited functions wherein the battery can be reconfigured to match a hybrid vehicle with variable DC main bus voltage and to match a shorter-life, higher-power mode (re: **claim 20**), and is adapted for use in high-to-extreme peak-to-average power output pulsed power applications and platforms for non-vehicular applications (re: **claim 32**).

Once this prima facie case for each of the claims 20 and 32 has been established, the burden shifts to the Applicant to show that the prior art structure does not possess the functionally defined limitations of his/her claimed apparatus. *In re Schreiber*, 128 F.3d 1473, 44 USPQ2D 1429, 1432 (Fed. Cir. 1997).

10. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 6703722) in view of Knowles et al. (US 6465931).

As discussed above, Christensen discloses all of the features of the electronically reconfigurable battery system of claim 1 from which Claims 7 and 8 depend.

The electronically reconfigurable battery of Christensen lacks explicit disclosure that the switches are (re: **claim 7**) insulated gate bi-polar transistor (IGBT) and (re: **claim 8**) MOSFET switches.

However, Knowles et al. teaches a battery-driven electrical power distributing circuit system that uses both MOSFET and IGBT switch technology.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have substituted for the switches of Christensen the MOSFET and IGBT switches as taught by Knowles et al. in order to ensure faster switching with less or non-

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existent arcing during the switching event, thereby extending the useful life of the circuit and reducing life-cycle maintenance requirements.

11. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen in view of Knowles et al. (US 6465931) and further in view of Kaman (US 5660246).

As discussed above the combination of Christensen and Knowles et al. meets the limitations of claims 7 and 8 from which claims 9 and 10 depend.

The combination of Christensen and Knowles et al. as used above lacks explicit disclosure wherein the IGBT and MOSFET switches employed in the battery reconfiguration circuit are opto-insulated switches.

However, Kaman teaches an electrical circuit control system using opto-isolated switches.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have used opto-isolated IGBT and MOSFET switches in the battery reconfiguration circuit of the combination of Christensen and Knowles et al. in accordance with the teachings of Kaman in order to, for example, have the reconfiguration switching activated by remote commands using a light source transmission medium for remote control of the electrical power reconfiguration system.

12. Claims 22-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 6703722) in view of Toda (US 5900697).

As discussed above, Christensen discloses all of the features of the electronically reconfigurable battery system of claim 1 from which claims 22 and 23 and their respective dependents, claim 26 and 27 depend.

Christensen further discloses operation of the DC power supply reconfiguration circuit in either fully erected configuration as recited in claim 22 (refer Fig 1) or partially erected as recited in claim 23 (refer Fig 12) configurations.

The electronically reconfigurable battery of Christensen lacks explicit disclosure of a series current limiting device, network or system in the circuit with the fully erected (**re: claim 22**) battery limiting DC current or with the partially or sequentially erected (**re: claim 23**) battery, wherein (**re: claim 26 as dependent from claim 22, and claim 27 as dependent from claim 23**) the current limiting device, network or system consists of a resistive or inductive component in a RC or LC current limiting circuit.

However, Toda (refer to Figure 1 and the associated text) teaches a current-limiting DC impedance circuit system (8) consisting of a resistive or inductive component in a RC or LC current limiting circuit inserted in a circuit between a battery power supply module (1) and its load (7) in order to limit DC current drawn from the battery reaching the load.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have modified the disclosure of Christensen to include a DC current limiting system on out between the battery module and the load in accordance with the teachings of Toda in order to prevent a current larger than the maximum current allowable to flow in the load as suggested by the reference at column 2, lines 17-18.

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13. Claims 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 6703722) in view of Toda (US 5900697) and further in view of Albrecht et al. (US 5654881).

As discussed above relative to claim 23 from which claims 24 and 30 depend, the combination of Christensen and Toda discloses all of the features of a reconfigurable battery system further comprising a series-current-limiting system between the load and the reconfigurable battery system in its partially-erected configuration.

The combination of Christensen and Toda as applied to claim 23 lacks explicit disclosure wherein (**re: claim 24**) the current limiting device comprises a single stage converter (SSC) whose output voltage is limited to the voltage level of the battery module, and further wherein (**re: claim 30**) the SSC circuit topology is chosen from a group of Buck, Boost, Buck/Boost and others as recited.

However, Albrecht et al. teaches a DC power supply (Fig 1 and refer col 1, lines 45-53) configured with a single-stage converter on output whose output voltage is limited to the voltage level of the battery module (refer col 7, lines 15-60) and with circuit topology to operate either as Buck converter or as a Boost converter (refer to item 14 and associated text at col 2, lines 47ff).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have modified the reconfigurable DC power supply circuit of the combination of Christensen and Toda to further include, in accordance with the teachings of Albrecht, a DC-DC single-stage power converter (SSC) circuit on output of the battery module providing a power Boost capability when the reconfigurable battery module is operating at low output voltage and providing a Buck conversion when the reconfigurable battery module is

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outputting greater voltages in order to achieve a required DC output voltage with some degree of regulation for a very large voltage range input to the SSC as suggested by the reference at column 1, lines 34-36.

14. Claims 11- 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 3923116) in view of Field (US 2002/0179349).

(Regarding the limitations of claim 11):

a. Thompson et al. discloses a vehicle having an electronically reconfigurable battery (16) for providing a source of propulsion energy to the vehicle load and for providing a source of energy for a short-term and/or pulsed load provided on the vehicle, the reconfigurable battery comprising a first plurality of battery modules battery modules (Fig 5, item 16), a first plurality of battery modules (Fig 5, items 31, 32); a plurality of switches (81, 82) selectively interconnecting the plurality of battery modules (refer col 8, lines 47-51), wherein a selectable number of the plurality of battery modules may be connected either in a series configuration or in a parallel configuration (refer col 2, lines 16-20), as a result of placing selected switches of the plurality of switches in open states or closed states; and an output switch (83) connecting an output terminal of the battery to the vehicle load (14).

b. Thompson et al. discloses an all-electric vehicle rather than a hybrid vehicle and lacks explicit disclosure wherein the output switch also connects another output battery terminal of the battery to a short-term and/or pulsed load of the vehicle.

c. However, Field teaches a hybrid vehicle (refer Fig 3) having a prime mover (item 24) providing a primary source of propulsion energy to a vehicle load (the traction motor (16) for driving the wheels (12b) of the vehicle) and having a plurality of batteries (18 and 30) one of

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which (viz., 18; refer para. [0025]) provides a secondary source of propulsion energy to the vehicle load and the other (battery 30) being connecting to short-term and/or pulsed electrical loads of the vehicle (refer para. [0035]).

d. Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have modified the all-electric vehicle of Thompson et al. to be a hybrid electric vehicle by adding a prime mover providing a primary source of propulsion energy to the traction drive motor and adding a secondary output terminal of the reconfigurable battery to provide electric power as needed to short-term and/or pulsed electrical loads of the vehicle in accordance with the teachings of Field in order to provide a more powerful source of propulsion to drive the vehicle and to provide a separate source of electricity to the other electrical loads of the vehicle that are short term and/or required only at intervals, such as the horn, windshield wipers, lighting system and engine starter motor as suggested by the reference at paragraph [0035], lines 9-12.

Re: claim 12, Thompson et al. further discloses (Fig 5) wherein each of the plurality of battery modules (31, 32) is associated with at least three of the plurality of switches (taken as switch 81 and the two other switches, both numbered 82), one of which (81) connects the batteries in series when closed, and the other two of which connect the batteries in parallel when closed, such that when the one switch (81) is closed the other two (82) are open, and when the one switch (81) is open the other two switches are closed.

Re: claim 13, Thompson's disclosure addresses battery reconfiguration in the context of only one battery module. However, it would have been obvious to one of skill in the art to have modified the reconfigurable battery module of Thompson et al. to include a second plurality of

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battery modules each connected in parallel with each other and where the first plurality is selectively connectable to the second plurality through at least two of a plurality of switches, in order to provide redundancy against failure of a module or to provide more electrical power for the system, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Re: claim 14, Thompson et al. discloses that the vehicle load comprises a motor (14) for propelling the vehicle.

Re: claim 15, The combination of Thompson et al. and Field as applied to claim 11 lacks explicit disclosure that the first load comprises an electromagnetic armor system. However, this claim recitation is a recitation of intended use and has not been given patentable weight since it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

15. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 3923116) in view of Field (US 2002/0179349) and further in view of Knowles et al. (US 6465931).

As discussed above, the combination of Thompson et al. and Field disclose all of the features of the hybrid vehicle and the electronically reconfigurable battery system of claim 11 from which Claims 16 and 17 depend.

The hybrid vehicle with electronically reconfigurable battery of the combination of Thompson et al. and Field as applied above to claim 11 lacks explicit disclosure that the switches are insulated gate bi-polar transistor (IGBT) and MOSFET switches.

However, Knowles et al. teaches a battery-driven electrical power distributing circuit system that uses both MOSFET and IGBT switch technology.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have substituted for the switches of the combination of Thompson et al. and Field the MOSFET and IGBT switches as taught by Knowles et al. in order to ensure faster switching with less or non-existent arcing during the switching event, thereby extending the useful life of the circuit and reducing life-cycle maintenance requirements of the vehicle.

16. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Thompson et al. (US 3923116) and Field (US 2002/0179349) in view of Knowles et al. (US 6465931) and further in view of Kaman (US 5660246).

As discussed above the combination of Thompson et al., Field, and Knowles et al. meets the limitations of claims 16 and 17 from which claims 18 and 19 depend.

The combination of Thompson et al., Field, and Knowles et al. as applied above to claims 16 and 17 lacks explicit disclosure wherein the IGBT and MOSFET switches employed in the battery reconfiguration circuit of the vehicle are opto-insulated switches.

However, Kaman teaches a vehicle electrical circuit control system using opto-isolated switches.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to have used opto-isolated IGBT and MOSFET switches in the battery reconfiguration circuit of the hybrid vehicle and battery configuration switching circuit of the combination of Thompson et al., Field, and Knowles et al. in accordance with the teachings of Kaman in order to have the reconfiguration switching activated by remote

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commands using a light source transmission medium for remote control of the vehicle and its electrical power system in harsh environments not conducive for direct control by an on-vehicle human operator.

Allowable Subject Matter

17. Claims 25, 28, 29, and 31 are objected-to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art made of Record

18. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure. The prior art of Chaussade et al.; Hansen et al.; Matsubara et al.; Schmitz et al.; McCullough; Simon; Potega; and Juzswik et al. each show features in common with some of the other structures of the inventive concept disclosed in the instant application.

Conclusion


19. Any inquiry concerning this or earlier communication(s) from the examiner should be directed to Gerald B. Klebe at 571-272-6695; Mon.-Fri., 8:00 AM - 4:30 PM ET, or to Supervisory Patent Examiner Christopher P. Ellis, Art Unit 3618, at 571-272-6914.


Official correspondence should be sent to the following TC 3600 Official Rightfax numbers as follows: Regular correspondence: 703-872-9326; After Finals: 703-872-9327; Customer Service: 703-872-9325.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 gbklebe / Art Unit 3618 / 2 May 2005


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